JUL 9 1917
UNIV. OF MICH.

SCHOOL AND SOCIETY

EDITED BY J. McKEEN CATTELL

Volume VI | SATURDAY, JULY 7, 1917 | Number 132

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SCHOOL AND SOCIETY

Volume VI SATURDAY, JULY 7, 1917 Number 132

THE CHANGING PUBLIC[1]

THE history of library work in this country is one of continual advance since the first conference of the American Library Association. The place of the free public circulating library in this advance has been the central one, not only by reason of its extent, but also because its idea and purpose is a new force in public life. The character of its work has changed and is changing with new conditions which have resulted from the expansion of the field of public library activity and the founding of new libraries to meet special needs. The greatest problems of the free circulating libraries come from the change in their public rather than from need for new methods of administration.

The American Library Association was peculiarly fortunate in its founders. It is most remarkable that there was so much genius for detail in that body of pioneers of library cooperation. It was a scholarly body, hence its clear vision of the future wide use of books and its ability to lay the foundation of the structure of the public library as a civic institution is easily understood. Its skill in designing and so far perfecting the methods of conducting this new work of its dreams is more surprising.

The development of library methods is not unlike that of the designing of the printed book, which has been described as having been "mature at birth." There has been little change in the ways of doing library work since the early years of the Association. Most of the contributions of later years have but filled in the outlines which were drawn at that time, to meet the requirements of the larger work, just as the schemes of classification devised at the same period have been elaborated to meet the need of a much greater number of books and subject headings. It is difficult, without a thorough review, to realize how large a part of our professional knowledge we owe to the early conferences.

The American Library Association brought together for the first time the library people of the country, who came mostly from university and reference libraries, some from society libraries and others from the few public libraries of that time; who had, as individuals, worked upon many of the same problems and now found opportunity to compare experiences and to discuss questions of method. The early conferences were extremely effective. Classification, cataloging, arrangement, housing and storage of books, standards of materials and furniture, the training of library workers, the freedom and restrictions of the use of libraries, the formation of public opinion as to the place of the library in education and in the social life of the community—all of these and many more questions of policy and method were discussed under the new-found stimulus of cooperation.

The thoroughness of the early conferences in the discussion of these matters and the early standardization of details have had much to do with the rapid expansion of library work, the extent of

[1] Presidential address before the American Library Association, Louisville, June 22, 1917.

which is shown by the growth of the American Library Association from its small beginnings to its present membership and its diversified interests. The original membership of the Association was made up, with few famous exceptions, from small libraries. The users of the libraries were from limited small groups of people having tastes and needs more or less analogous. This was almost as true of the few public libraries of that time as it was of the university and subscription libraries.

The new enthusiasm aroused by the conferences awakened librarians to tremendous possibilities in the general use of books, and aroused in them an ambition to have as many as possible of the people of their communities counted among their readers, aiming from the first to supply "the best reading for the largest number at the least cost." The libraries became more and more of a social force, the value of their books being measured not so much by their numbers or by their rarity as by the service they might render to the community in which they are placed.

In the development of the public library from the small collection of books in care of a very small staff, offering something to read to a very few people, to the large systems of to-day, with their many departments and many libraries to meet the complex needs of the many-sided life of our big cities, is the evidence of a new public and new problems calling for special work by the public library and for special training for its workers.

A large part of library training is at present given to matters which do not touch the most important work of the public library. Necessary as is the fascinating study of methods, the perfecting of classification and the making of catalogs, this is, after all, only a preparation for the making of the tools, only smoothing the way for doing public library work, rather than training for the real work itself. The average reader using the public library has no interest whatever in library technique, and measures the excellence of the library only by the simplicity and quickness of its service in supplying his need.

The most important training, so far as the public library service is concerned, is that which contributes toward an understanding of the things of the spirit and of the activities of the world, a knowledge of the past, a knowledge of books, and above all a knowledge of and a liking for people. These, together with the ability to know people in their varied life and interests and to be able to help them, with broad sympathy, to choose the right book at the right time, are qualifications desired for a large part of the public library.

The larger part of the work of the public library of to-day is work with the many as contrasted with its earlier work with the few. The original small group of library borrowers was probably of the more intellectual members of the community. Although the public library of the present does not neglect the interests of the scholar, and, because of the system of inter-library loans, it is better able than ever to serve him, yet its emphasis has changed as the circle of its influence has been drawn larger and larger, bringing within its influence more and more of the less educated and less trained. The public library is thus becoming, year after year, the elementary, the secondary, and the part-time school, rather than the university of the people, as it used to be called. What the library offers must serve as the nearest approach to formal educa-

tion that the larger proportion of the people who have had but a few years of school can ever hope to have, yet we must admit that in large measure any real training by the use of books our readers may receive is, for the most part, a matter of chance.

In his "Manual of Drawing," W. W. Rawson says:

> Throughout the course, I have taken it for granted that drawing is not studied in the elementary schools primarily as art, any more than reading, writing and composition are studied primarily as literature. We are not in the habit of supposing, when teaching a child through verbal means to think logically and express himself clearly, that we design him to be a novelist.

Something akin to this is the service of the public library to large numbers of its present public who, whatever their years, are elementary readers. Very many of them have a realization of an ill-defined need—a need to know, a need to do, a longing for some foundation for hope, some expectation of satisfaction. They use books, when they wake up to the possibiltiy of help from them, as a means toward more abundant life—more intelligent, more efficient, more powerful, more satisfying. Life and growth are the objects of their search, not the study of literature, not the appreciation of the beauty or perfection of the medium through which they satisfy the need of definite knowledge and the indefinite hunger for a wider outlook and for the foundation for a more vivid hope. The very absence of the literary touch is sometimes an advantage in a book to be used with such elementary readers.

Different libraries at work to-day could be used as a graphic exhibit of the interesting development of the public library in all its stages, from its simple beginnings to the largest library systems. In most places, whether town, city or county, the public library is at the beginning not only wholly in one building, but it is without any division of its borrowers. Its organization into departments for administrative purposes comes with its increase of use. One group after another is given special attention by being provided with a separate collection of books in a department under the care of an expert attendant or staff. The children's room is followed by the technical room, the art and music room, the civic room, and others organized to meet the special needs of the community. In time the library discovers that many possible readers, unconscious of the help which it offers, are really waiting to have the library brought to them, and library extension work is commenced. Library stations, depositories and branch libraries are opened, while traveling libraries are sent to readers in schools, shops and clubs, and book wagons and parcel post bring many more individuals within touch of the public library.

In some cities the work of the public library has been so completely organized that every section is within easy reach of some agency of distribution. Even where this is accomplished, the use of the book continues to increase and the possibilities of more intensive work are still far from being realized.

Of late years there has come a new development which will not be without direct effect upon the work of the public library. We are witnessing the formation of new libraries, some possibly for the present merely as departments of older ones, but many of them entirely independent of the public library. We have libraries of civics, libraries of legislative reference, thoroughly organized school libraries, special libraries in many large industrial plants and corporation offices, and libraries in business and professional clubs, many of them in charge of librarians

trained for their special field. The public library has no feeling of rivalry or jealousy toward these independent libraries for special needs, but rather does it feel a sense of relief to have certain groups of readers better cared for and, at the same time, to have made available more time and means to broaden the usefulness of the public library for the less specialized readers, thus bringing more of its resources to the service of its primary function—that of making better and more intelligent citizens, of raising the average of citizenship, and the Americanization of new Americans.

Looking toward the more elementary work required by the larger part of its recruits gives to the free public library its widest vision for the future. It is far from having yet measured its possibilities for usefulness, for the extent of its influence reaches far into an undiscovered country which is very alluring.

In addition to what the public library has been able to do to help the specific work of the school, it has found in the school one of the best and most fertile opportunities for creating a love of good reading. It should be remembered, however, that, while the work of the library goes on in the school from year to year, the average individual child is under the school's influence a very brief period, after which the children become a part of the general public. To what extent the public library retains these former school children as library readers it is not possible for us to say. We do know that an ever increasing number of them are finding after a few years that the brevity of their school period has proved a handicap in doing their work in the world and that they are eager to gain further training.

Nearly every one of our cities has a few hundred, some many thousands, of people under an even greater handicap than the limited time pupils of our day schools, because they are without the language of the country. We know the children of these people, with their eagerness for information concerning America and their quickness in picking up American ways, but comparatively few of the elders of these new Americans are as yet in touch with the public library. The reason for this may be because of their hesitation to enter a formal building doubtful of what their reception may be, rather than from any lack of appreciation of what the public library has to offer them.

A certain public library issued, a few weeks ago, a special invitation to the pupils of the English classes of the night schools to attend an evening reception. In preparation for this evening the pupils were told about the public library, what it was and what they could find there, and were taught certain English phrases to facilitate their asking questions and making their needs known.

As the acceptance of the public library invitation was optional, there was much speculation as to the number of these pupils who would be enough interested to expend an evening and carfare for the purpose. The Supervisor of Night Schools estimated five hundred, while the librarian hoped that two hundred and fifty could be induced to come. The fact was that more than one thousand men and women, representing many nationalities, visited the library building that night and evinced the greatest interest in the library and what it had to offer them as an educational institution. It was a revelation of a large section of the public which, through lack of some point of contact, was not getting the service which the public library should render.

Many opportunities of informal education are now being offered to grown people and a natural question arises as to what extent they are finding any association or con-

nection with the public library in these substitutes for formal schools.

It would seem as if the public library had a duty fully as important, probably more important, toward the many out of school, who are seeking information, as the duty, fully recognized, which it renders to those still under educational guidance.

In the phrase "informal education" is included all the means of more or less systematic education other than the schools, such as the various industrial training classes in manufacturing plants, corporation schools, reading courses offered by the Chautauquas and similar institutions, movements like that of the Society for the Promotion of Engineering Education, the study work of business, social and trade clubs, lecture courses available to the public, university extension work and the educational possibilities of art galleries, museums, public concerts, parks and other municipal activities.

Some of these educational efforts do have close cooperation with the public library, but there are others which have very little or none at all. The public library might, for its own part, however, not only be familiar with all the educational agencies in its community, and what they offer, but might easily become a valuable supplementary factor in all such work, and might, at the same time, bring to the pupils an acquaintance with the opportunities offered by the library itself.

The students connected with such groups are, however, but tens of the hundreds and the thousands of readers who are finding their way among our books.

Should the library assume any further responsibility toward aimless general readers? Library policy has provided them with open shelves upon which the books are grouped by subject, it makes small attractive collections of books upon subjects of special or passing interest, it provides printed lists of annotated titles to induce the readers to select the better books and encourages in every way the use of good books—but is it neglecting an opportunity to help the individual? Every public library can furnish illustrations of certain borrowers who have developed and advanced under the sympathetic guidance of some library friend, and these borrowers are perhaps but representatives from a large class which might be helped if a way could be found to offer something more in the way of individual suggestion, if not individual training.

Without formalizing in any way the work of the public library, without its becoming less broad in its sympathies, it may find it possible to arrange courses of reading with guidance which would attract some of its many desultory readers. In some departments, at least, there would be little difficulty in finding the right people to cooperate with the library in this kind of work.

A trained technical or vocational teacher would be of considerable value in the library to help with personal counsel and advice in their difficulties many of those who are using books more or less blindly in the continuation of their elementary technical study in connection with their work, and to arrange and supervise reading courses for the workers in various trades, arts and occupations.

It may sometime prove possible to have a teacher assigned by the school authorities for this duty, in the same manner as the library has often assigned an expert to help the library work in the schools.

A library reading course might well be arranged in academic studies, as well as vocational, under volunteer inspectors or advisers.

To every workman there are eager apprentices who are hungry to know, not his way, but the way. Every workman who does the best he can has a

store of value for the younger ones, who are drawn, they know not why, to the production he represents. . . . I would have my country call upon every man who shows vision or fineness in any work to serve for an hour or two each day . . . telling the mysteries of his daily work (*Comfort*).

Is it not possible that the public library can use its wonderful medium as a link between those eager to learn and the skilful, intelligent workers who know?

In the continued expansion of the work of the free public circulating library into that "untraveled world whose margin fades forever and forever," may it not go much further than it has yet gone towards supplying a need constantly apparent of many of our untrained readers? May it not think more seriously, broadly and sympathetically of responding to the definite needs of the individual, and make quantity in the circulation of books secondary to nourishing the more abundant life?

WALTER L. BROWN
LIBRARIAN OF THE PUBLIC LIBRARY,
BUFFALO, N. Y.

REQUIRED MATHEMATICS[1]

DURING the last two or three decades there have been many signs of unrest among teachers of mathematics. The so-called Perry movement, though anticipated in some of the courses at Harvard, was one of the first indications that there was a strong insurgent minority party disturbing the smug content of the old conservatives. While Perry's text-books were not a great success, his ideas, toned down, it is true, have made their way into most of our elementary mathematical courses.

Another indication of dissatisfaction is seen in the innumerable reports on the content of algebra and of geometry. Syllabus after syllabus has been worked over in committee, discussed in meetings, printed in book-like pamphlets and then consigned to the place where many pamphlets go and hide themselves. For most teachers they are pretty long and not very specific in their recommendations. Allied to this discussion of the content of our mathematical courses is the more recent movement towards combining courses in algebra, geometry and trigonometry. Most teachers are looking forward with great interest to the many experiments with these courses which are now going on.

Probably the most important sign of unrest is seen in the world-wide movement which led up to the formation of the International Commission on the Teaching of Mathematics, at Rome in 1908. The work of this commission has resulted in scores of articles in many languages on all phases of mathematical instruction. In the United States, the Bureau of Education has undertaken the publication of reports concerning teaching in this country. Not the least interesting thing about this movement is the long list of names of mathematicians of the first rank who are taking active part in constructive criticism of the teaching of secondary mathematics.

The results of these movements among mathematics teachers are made manifest in many changes and improvements. They have added the words "correlation," "unification," "efficiency," "laboratory" to our vocabulary. They have brought forth a new set of text-books, have founded new societies and periodicals and have strengthened old ones. Most important of all, they have brought the teachers of elementary and of advanced mathematics into closer touch.

The end is not yet, for while the debates about changes were going on among those primarily concerned with the teaching of mathematics, the general educators and the public began to discuss mathematics from an altogether different standpoint. First

[1] Paper read at the Fourteenth Annual Conference of Kansas High Schools and Academies, March 16, 1917.

one and then another began to be skeptical as to the study of mathematics at all. Some scoffed at the idea of usefulness in algebra or geometry. They conjured up a body of men who claimed that mathematics was taught to strengthen the "reasoning power," and they consigned it to the limbo where dwell phrenologists and astrologers. Where the logic of their arguments was weak, vehement phraseology was used. We see such phrases as, "Our educational system is rotten," "Mathematics is on the operating table," "Why should we worry our boys with algebra?" "Algebra is a time-wasteful fetich." From the more moderate critic we have, "Mathematics along with the classics has been placed on trial from the point of view of its practical value for the mass of our people."

Quite recently the ideas of those educators who question the position of mathematics in our secondary schools have been crystallized into very definite shape by two or three men of such prominence that their objections and questions have attracted general attention outside of educational circles. Among the criticisms we find: Mathematics as taught is too mechanical and formal. The reasoning is deductive while practical living demands induction. It is artificial. The time at which it is studied, the time devoted to it, the manner in which it is taught, the amount to be covered are determined by tradition, not by any consideration of the needs of the child. The subject is difficult. The average child is not mathematically inclined. Algebra is kept up because it is easy to teach. Algebra is mysticism to the parent. Should the girl be made to study algebra? The present dominance of mathematics is due to its service to colleges and universities who use it as a sieve for sorting out young men and women.

It should be emphasized that these criticisms come from men who are not prejudiced against mathematics. Many of the criticisms have been raised by teachers of mathematics, and are the causes of the unrest which we have found under the names, Perry movement, efficiency, and so on. Some educators have asked: "If an educated man is one who is trained to know, to care about and to understand the physical and the social world in which he lives and if the curricula of our schools for producing such men were determined by present American needs and not by tradition, in what respects would the new schools differ from the old?" Discussion of this question has given rise to much of the criticism of required mathematics. In these new schools nothing is to be included "for which an affirmative case can not now be made out." If mathematics is to be required, positive proof must be offered that mathematics is necessary if one is to "know, care about, and understand the physical and social world in which he lives." In order to keep required mathematics out of such a school it is not at all necessary to show its undesirability. Instead of the state proving the prisoner guilty, it is now up to the prisoner to prove himself innocent. My neighbor's house burns in a mysterious way. In order to associate with him on the same footing as before I must prove conclusively to him that I did not set the house afire.

To the mathematics teacher, the word "prove" has a formidable sound. He rather instinctively imagines two very large groups of boys and girls who are known to be of equal ability. One group is required to study a certain amount of mathematics. The other group may take mathematics or not, as it pleases. Both groups are carefully followed for several years, a definition of education is given which is acceptable to educators, psychologists, mathematicians, and to the public, a scheme of measurement is designed for finding out the number of units of this education a given person contains, the results are tabulated and pub-

lished and required mathematics wins or loses by a definite score.

In the answer to the criticisms, the teacher of mathematics may take one of several positions. He may, for example, shrug his shoulders and tell his critics to prove their case. We have always had mathematics in the curriculum, and since possession is nine points in the law, here as elsewhere the eviction should be done according to due process of law. However, in general, the teachers have not done this. They have gone into the discussion of the question in much the same spirit that they would attempt the solution of any other problem. The whole subject is but an extension of the discussions of the past two or three decades within the mathematical family, where much time and energy was spent on the question, "What kind of mathematics should be required of all high-school pupils." In mathematics we often use a process in which we prove that if a solution exists, then it is thus and so. To give a complete answer to the problem, it must be proved that there really is a solution. The theorem, "Mathematics should be required of all high-school pupils," is then the existence theorem for which the mathematics teacher and others are seeking a proof. If he can not prove the theorem as stated, he would like to know what assumptions or changes he must make in the wording of the theorem.

The first thing in the attack on the problem is to find out what has been done by others. The general educator, the psychologist and the layman have had and are having their attempts at a solution, and have as much interest in it as the mathematics teacher. The layman, though somewhat shaken by the arguments of our critics, is, on the whole, a friend of mathematics. As soon as he sees the mathematician settle down to work on the problem, he hopefully but hesitatingly suggests, "Doesn't mathematics improve the mind?" The mathematician turns to the general educators and the psychologists who seem very much stirred up at the question. They say that the question is the very ancient one concerning formal discipline, or general training or faculty psychology. At some time there is supposed to have been a man, or class of men, who had a theory that there was a certain thing called the mind and that this mind had certain powers, "reason," "memory," "judgment," which were to be trained and strengthened by certain studies, and this training and strengthening process was defined as education. Some educators tell us that this formal discipline is a "heritage from the past," "an outworn psychology." "Memory and reason are just words, there are no such things. Only memories and reasonings exist." "One studies Latin to become proficient in Latin, algebra to learn algebra. A course in geometry helps a pupil in a second more advanced course in geometry, but has no effect in a course in history."

But other men tell us that, while formal discipline as above defined no longer has any advocates, yet there is a fairly well defined theory, believed by most psychologists, that training gained in the study of one subject is of use in the study of some other subjects. Psychologists use the technical word "transfer" in this connection. The real question at issue is the amount and method of transfer. Bagley's statement of this question is:

> The present interpretation of the doctrine of formal discipline is based upon the belief that specific habits may be generalized into ideals and prejudices, which in turn make possible the acquisition of similar habits in new fields, as when from the specific habits of accuracy and close reasoning developed in the school exercises in mathematics one comes gradually to idealize accuracy and close thinking as methods of procedure that will bring desirable results in other fields.

One of the first steps in answering the question, "Should mathematics be required of all high-school pupils," would be, then, to investigate the "spread," "transfer," "generalizing power" of mathematics. It is, of course, a formidable problem. We all believe that a boy who has passed a thorough course in algebra will do better in many new subjects than the boy who has not taken the algebra. What these new subjects are and how much better the first boy will be in them are things to be found out. The number which represents the "how much better" we might call the "factor of transfer," or "coefficient of spread." We already have this number for a few special cases under the name "correlation coefficient."

In 1907 Rietz and Shade[2] examined the grades of some twelve hundred students who carried courses in mathematics and foreign languages simultaneously. Certain limitations were imposed so as to make the conditions under which the subjects were studied as nearly identical as possible. All cases in which there were fewer than two grades in each subject were omitted. Only those cases were considered in which the student had had previous training in French or German in the high school as well as the training in elementary mathematics. This investigation resulted in a correlation coefficient 0.48. To give a clear idea of what this means, the result is compared with the question of stature of father and son, or of brother and brother. In the long run we naturally expect a close relation between the stature of men in the same families. A race of tall men are likely to have taller sons than a race of short men. The correlation coefficients in the cases of stature of father and son, and of brother and brother are 0.40 and 0.39, respectively, or less than the correlation between efficiency in mathematics and efficiency in foreign languages. At the time of this investigation the correlation coefficient for mathematics and natural science was derived and found to be 0.44.

In 1905, F. C. Lewis[3] published some results concerning the ability of students in mathematical reasoning and in practical reasoning, also in mathematical reasoning and in law. His article resulted from the examination of the grades of law students in mathematics and in law at Dartmouth college. He deduced the result "that students able in mathematical reasoning are not even generally able in practical reasoning and law." His deductions seem to have been subject to the common error that cases showing great differences were emphasized and cases showing little or no difference were neglected. Moreover, the data published in the paper were too meager to be used for checking purposes. In 1915 Professor Rietz[4] was furnished the data for the years covered by Lewis's paper and he obtained the high correlation coefficient of 0.53, showing a very positive relation between efficiency in mathematics and in law. Mr. Lewis's conclusions as to efficiency in mathematical reasoning and practical reasoning are subject to the same criticism as in the case of mathematics and law, *i. e.*, cases favorable to his argument were overemphasized.

Professor C. N. Moore[5] has found some correlation coefficients for high-school boys and girls as follows:

Algebra-algebra (boys) $r = 0.71$,
Geometry-English (boys) $r = 0.52$,
Algebra-English (girls) $r = 0.65$,
Geometry-English (girls) $r = 0.59$.

He draws attention to the case of algebra-algebra to show that there is no basis for

[2] "University of Illinois Studies," Vol. III., No. 1, p. 19.

[3] *School Review*, Vol. 13, p. 281.

[4] *Journal of Educational Psychology*, February, 1916.

[5] SCHOOL AND SOCIETY, Vol. II., p. 378

the contention of some writers that there is little relation between subjects, the grades in which do not give a correlation approaching unity.

The above deductions of correlation coefficients are based upon school grades. We all know that school grades are subject to many errors when used to measure abilities. It is this fact upon which objections to reasoning from these correlation coefficients is based. It is true that we should not use what has been done in this connection as a conclusive argument to show that efficiency in mathematics guarantees efficiency in other subjects. However, it points out a path of investigation which may lead to definite results.

In April, 1915, Professor Hancock, of the University of Cincinnati, prepared a letter asking the recipient to indicate which one of four courses in a high school he or she would advise a boy to take.[6] The four courses were

1. A course in which mathematics and the classics were optional.
2. Mathematics required, classics optional.
3. Classics required, mathematics optional.
4. Mathematics and classics required.

The letter was sent to thirty distinguished lawyers, thirty prominent physicians, thirty eminent clergymen, and thirty men of affairs, men nationally prominent as bankers or railroad officials. None of these men or women were teachers, engineers, inventors, chemists, army or naval officers, none required a strictly mathematical training in their professions. A total of ninety-nine answered the letter, of which eighty-one put down the number 2 or 4. Only five voted for optional mathematics and classics. The same circular letter was sent to one hundred and eighty prominent people of Cincinnati of whom one hundred and five answered. Eighty-seven of these voted for the second or fourth course, and 7 for the first. In both lists approximately 82 per cent. voted for required mathematics in the high school. Professor Hancock's article, in which he sums up these results, is made the more impressive because he published the names of the voters with their votes and remarks.

Of course, it will be argued that we have here simply the opinions of men who are answering in a way pleasing to the questioner, or who are bound more or less by tradition. What about the 96 men who didn't have enough interest in the subject to answer? What do the people who answered know about educational or psychological questions? Can not adroitly worded questionnaires be devised to prove almost anything? Notwithstanding these objections, we are justified in saying that there are many men and women of national prominence who still hold to the idea that there is disciplinary value in mathematics.

In connection with the problem of formal discipline some authors have shown with considerable experimental backing that the method of teaching has great influence on the spread of a specific training into other fields. It has been shown by some rather conclusive experiments that if a subject has been so taught that the pupil gains a respect for its content and an appreciation of its method and aims, then there will be a greater degree of transfer. This means that the attitude of the teacher and of the student to the subject is to be as important as the subject matter. A boy may be given a list of the principles and theorems of algebra. He may learn the principles and be able to prove the theorems and may become skilled in its technique, but if he has no appreciation of the aim of algebra or its general method,

[6] School and Society, Vol. I., p. 893.

his knowledge will "function" in the next course in algebra and nowhere else. Even in the second course in algebra it is easy to see that he will find it harder because he failed to recognize the general nature of many things in the first course. The idea embodied here, under the name conscious transfer, is what some psychologists and educators think will be the successor to formal discipline.

To the teacher of mathematics who is taking up the problem of required mathematics, the question of formal discipline is not a dead question. He is not very particular as to names. We have shown that there is evidence from mathematicians, educators, psychologists and men of affairs that there is some sort of general training in mathematics, call it formal discipline, transfer, generalization, or what you will. He is intensely interested in the question of just what is the nature and extent of this training. He would like to know how mathematics compares with other subjects. We can not say that the evidence we have cited is generally conclusive. We can see, however, that progress in the solution of the problem may come from a careful and critical study of correlation and a collection of correlation coefficients on the part of the mathematician aided by a measuring rod for measuring abilities from the educator.

One of the most persistent attacks on mathematics is that on the requirement of algebra. It is stated that algebra is too formal, too mechanical, too abstract. "It suggests mystical values to parents who see in it only a study which makes children work hard." "Few students like it and few ever get to use it as a tool," a statement which is very true if one carries out the analogy usually associated with the word "tool." The coupling of the words "mathematics" and "tool" paints for many people a picture of a young man, armed with a knowledge of mathematics, going forth into the world, and by means of a paper and pencil, dragging to light the unknown, and differentiating and integrating his way to a five-figure salary. But it is the same sort of a picture that we used to see of the country boy leaving the home farm. Behind him is the old farm and the weeping parents; in front down the long road that he is to take he sees the shadowy outlines of the Capitol at Washington. It is true that relatively few high-school pupils will actually use mathematics as a tool in the sense that they are thereby going to make new discoveries in engineering, chemistry, or science. But a somewhat similar objection may be raised to most high-school subjects. How many students will ever use the German composition over which he spends so much time? How many can use that most important subject in the curriculum, English, in such a way that it has a real money value? How many fathers and mothers can go back to their high-school course in botany and apply it to the flowers the children bring home?

In what, then, lies the usefulness of algebra, if so few are going to use it as a tool, and if it is still unproved as to how far the study of alberga helps us in other fields? Can we not replace it by something which will be sure to "function" for every pupil, something which can be proved to be of use to every one? The educated man or woman, according to the definition which has been proposed, is one who is trained to know, to care about, and to understand the physical and the social world in which he lives. Now algebra is called abstract. The first thought of the layman when he thinks of algebra is a maze of a's, b's, x's, and y's that affect him much the same way as the "abracadabra"

of the old time magician. There is nothing real about it. Not long ago I undertook to see if a ten-year-old girl could be taught to solve an ordinary linear equation understandingly. After half an hour she became so proficient that she wanted to show her newly acquired accomplishment to some one. Her first victim was the lady who presided over the kitchen. This lady showed little enthusiasm, remarking, "That's nothing but algebra. I started to study that once, but some days the teacher would say that x was three and on other days it was five and so I quit and stopped wasting time on such foolishness."

The usefulness of algebra lies in the fact that it is the language of an important part of that physical and social world which the pupil is to be trained "to know, to care about and to understand." As any science develops, it becomes more and more quantitatively exact and more and more is the English language found too cumbersome as a vehicle of thought and algebra becomes a necessity. The world is full of things that are related to other things, presenting the problem of finding out and exhibiting the law of dependence. Whenever the relation between two things is one which brings in the notion of space or quantity, the explanation tends to be geometrical or algebraic.

It is difficult to escape mathematics in the world the pupil is to be taught to know and care about. A man starts to business in the morning. He rides on a street car whose motive power comes from a maze of wire, machinery, complex fractions, radicals, and glass. On the car he reads in a paper that the Episcopal church has completed the collection of a fund of over $6,000,000 to establish a pension system for its clergymen. This pension scheme is said to be on a sounder foundation than most pension schemes, because more care was put into the mathematical work upon which its solvency depends. The car crosses a steel bridge which would be unsafe if a flaw were found either in the steel of which it is constructed, or in the algebra used in its design. As he enters his office he notices the extra click of the hand of the Western Union clock as it is corrected by a process based upon certain observations and mathematical corrections at a station a thousand miles away. During the day, he insures his life in an insurance company which is sound because the associative law of algebra holds and the theory of exponents does not vary with the time. A business deal makes it desirable to telephone to San Francisco and because of the mathematical work of Professor Pupin, he is enabled to do so. As he goes home he stops to look at an aeroplane in whose construction steel, algebra, nerve, and gasoline had important rôles. After dinner he reads an article illustrated by graphs on the rise and fall of his favorite baseball team, and before he goes to bed he looks out of the window to see the eclipse of the moon, the time of which had been calculated years before by the orders of the government.

One may ask, if algebra is in touch with so many real aspects of our daily life, why does it have such an evil reputation as a haughty, exclusive blue-stocking—too proud to occupy itself with the common realities of life. The answer for algebra is included in the answer for a like question as to mathematics in general. If one takes up an encyclopedia and looks up the word "mathematics," he usually finds a classification of the subject into various subtitles. No two encyclopedias agree on this classification. Indeed, the classification changes from one edition to another in the same encyclopedia. However, there is agreement on one point. Mathematics

is divided into the two divisions "pure mathematics" and "applied mathematics." This division of the general subject of mathematics into the two parts is carried out much farther than the usual simple separation into the two lists of subjects. The division is unobtrusively taking place in every branch of mathematics. There are two ways of considering every mathematical truth. One takes up the relations with other mathematical truths. These we may call domestic relations. For example, we have the relation between the general binomial theorem and certain special products which have come earlier in the course in algebra, or certain series which come later. Again, we may consider the mutual relations between the different properties of a proportion, or the relationship between proportion, ratio, variation, and the old rule of three. On the other hand, we have what we may call international relations. These are the relations with other branches of science or with other realities of our every-day life. Relatively speaking, the binomial theorem has little contact with the outside world. She stays at home and helps with the housework. On the other hand, the theory of proportion is here and everywhere. He is more respected abroad than he is at home. He is the boon companion of the man in the shop, consorts with the chemist, the draughtsman and the skilled engineer, and under the alias "variation" is often seen arm in arm with the practical physicist.

But let us come back to our question, why algebra is considered as "unpractical," "a time-wasteful fetich," "the vermiform appendix of our secondary education." This evil reputation is due in great part to the emphasis which has been placed on the one aspect of the subject—the question of domestic relations, if you please. This branch of algebra—we may call it the formalism of algebra if we wish—is what is usually called algebra by the layman. He is upheld in his notions by college-entrance examinations and by many of the recent tests of ability in algebra which have been designed. In these tests great emphasis is placed on the formal side. This is for two reasons—one, because a great many of our algebra courses have been formal in character, and another, because this side of algebra lends itself to a measuring process easier than the other side. A student may be very expert in "performing indicated operations" in factoring, in solving equations; he may be able to reduce many fractions to a common denominator in the allotted time, but if he has little idea of the use of these operations, little idea of the general method of algebra and if he goes no further in his mathematics, he has accumulated a body of information and developed a skill whose usefulness is a little difficult to explain to the parent without falling back on the "it trains the mind" theory. It is just this kind of a course which advocates of the "conscious transfer" idea seem to have shown to have the least effect in other fields. Some may say that such a student is a man of straw to be set up to be knocked down, but many algebra tests and examinations assume he exists.

I don't want to discredit the formal side of algebra. It is important, but no more important than the side which shows how algebra is part of the world about us. If I carried out the analogy with which I began, I would call the two sides the departments of domestic and foreign relations and call neglect of the applied side "unpreparedness." We should remember that we are considering the subject of algebra required of all pupils. This means that we have in view the pupil who leaves

before finishing the high school as well as the one who knows he is going to college to study some profession which requires a great deal of advanced mathematics. We are to keep in mind that all are to be trained to know, to care about and to understand his world, physical and social. In connection with the investigation of Professor Hancock, to which I have referred, an effort was made to find out how many high-school freshmen know what they are going to do on leaving high school. The following question was sent to a large number of teachers: "Before entering high school, out of every one hundred boys, how many do you think have definitely decided upon their future careers?" The answers varied from zero to twelve, with most of the answers between three and seven.

We are brought, then, to the question, "What sort of a course in algebra should we give these high-school freshmen, if we are going to equally emphasize the two aspects of algebra?" Are we going to add something more to our already overcrowded courses, or are some topics to be dropped? We shall see that a little rearrangement and shift of emphasis, rather than any change in the table of contents, is all that is necessary. The characteristic symbolism of algebra is introduced as a language—as a sort of shorthand way of writing down quantitative statements about things with which he is familiar. Great emphasis would be placed on the formula and all sorts of formulas could be brought in. The popular science magazines, the trade journals and catalogues, are mines of formulas about things which the modern boy or girl understands. The pupil should think of the formula as an algebraic declarative sentence that can be translated into Engilsh. Then evaluation leads up to the tabular presentation of the formula. Mechanical ability in the manipulation of symbols should be encouraged, through inversion of the formula, or what the Englishman calls "changing the subject of the formula." We have here also the beginnings of the equation, when our declarative sentence is changed to the interrogative.

It is but a step from the formula to the graph which should be introduced as an aid to the formula to present to the eye the results of a whole series of evaluations. The graphical representation of tabulated values, even when no formula is given, has become so generally useful that we find in all sorts of non-mathematical books illustrations of the use of the graph in exhibiting historical statistics, weather reports, price changes, and so on. The use of graphs in the solution of equations is perhaps rather superfluous in a first course in algebra, but I find nothing more pleasing than watching the eyes of a class when it is first shown the picture of an equation and its solution. One of these modern business stories in a recent number of the *Saturday Evening Post* was largely devoted to the use of graphs in visualizing business changes.

Closely associated with the graph and the formula is the notion of a function, though I do not believe I would use this rather undesirable word in the presence of the high-school freshman. There is nothing in the word which suggests to him the idea of dependence. The best approach to the function is through the formula and general algebraic expressions in one letter. For a long time the equation ruled algebra. Our attention was focused upon certain numbers which we called unknowns and which when substituted in certain given expressions gave certain given numerical values. Now our view is broadening to take in a whole set of values of a given expression. We discuss variables as well

as unknowns. We study the whole range of values of the expression and not just one or two which satisfy very limiting conditions. Graphically speaking, we have changed from an examination of the points where one curve crosses another curve to an examination of the curves themselves. This change in point of view is perhaps the most fundamental change which would occur in a course in algebra if full attention were paid to the place of mathematics in the real world.

At the present time there is a feeling among many mathematical teachers that our separate courses in mathematics, both in high-school and in college, will be united in one course by means of the function idea rather than by the skill of the bookbinder. I have in mind a rather recent European book on mathematics for non-technical students which is divided into chapters with headings somewhat as follows: "Linear Functions," "Quadratic Functions," "Algebraic Functions," Logarithmic Functions," "Exponential Functions," "Trigonometric Functions." In each chapter the author[7] carries the reader from the very elements of the subject up through the graphical representation, the analytic geometry and the calculus which applies to the particular chapter heading.

In a course in algebra, then, in which we try to present the subject in a way which touches the objects of the pupil's experience, the difference is one of accent and of point of view. No new topics are to be added. The course is more or less based on the related ideas of the formula, the graph and the function. The equation which has been supposed to rule algebra has a rival for the throne in the function. I have made no attempt to outline a course or to say just when the graph or the equation is to be introduced or when or how the negative number is to be approached. Of course we must admit that the fourteen-year-old is not a person of wide experience, and if we are going to make him feel that algebra is something besides "letters representing numbers," we shall sometimes be put to some trouble to show how certain parts apply—I believe that "show how certain parts function" is the correct phrase now. For example, I know of little in the experience of a high-school boy or girl which would give rise in a natural way to a problem which would necessitate the solution of a quadratic equation or much use of the laws of exponents. But he could be shown very important pieces of work in which quadratics and exponents come in as details. Some of the applied problems in an elementary mathematical course are like the wooden cups and stocking darners which the boy makes for mother or sister when he is taking manual training. I believe that a better name for these problems would be "problems clothed in the language of applications." The boy should not get the idea that these problems are the important part of the course. Other problems in algebra are like the gear wheels and pulleys he makes in the machine shop, rather useless things to him unless he can see how they fit in and become a part of a useful machine. We often see instructors in architecture pointing out details in buildings to classes. It would be possible to excite the interest of a high-school freshman by showing him some of the details of an important piece of work which has a mathematical setting. For example, he might be shown the quadratic equation which comes into the solution of the important problem of an electric circuit which branches off into two parts, or the theory of exponents which is a detail in problems as far apart as those

[7] Scheffers, "Lehrbuch der Mathemetik," Leipsic, 1911.

connected with the friction of a pulley belt and the problem of the construction of a mortality table.

In such a first course emphasis would be placed on "thinking" problems for drill in clear and precise thinking, a habit which we know will be carried on into the next courses in mathematics, and there is good evidence that it will be carried on into other fields, if there is a conscious attempt on the part of the pupil to see the worth of the method of algebra. When we have the final formulation of the problem of formal discipline we shall find that in mathematics, the question will be that of the amount of spread of this habit of open-minded and clear thinking.

If equal emphasis is placed on the two sides of algebra, and if the teacher tries to inculcate a habit of systematic investigation of data and reasoning from it, we shall, of course, expect to find considerable change in the attainments of our pupils. If a boy finishes a first course with a feeling and a knowledge that mathematics is in close touch with his world and that algebra is the language of an important part of that world, it is going to cost him something. Our courses are already too crowded for any teacher to be able to pry in additional material. In exchange he will have to give up some of the formal technique of algebra. He will be slower in the solution of literal equations, he perhaps can not proceed steadily through a complicated maze of radicals and parentheses within parentheses and arrive at the particular simplification which the author of his text-book has in mind. He will be poor in factoring and would have but a nodding acquaintance with the regulation four-storied complex fraction. All of this technique we would like a student to possess and he must have it if he goes on with any subject requiring much mathematics.

In one of the most scholarly addresses on the reasons for studying mathematics, McCormack[8] brings out the argument that mathematics is an "economization of thought, a capitalization of intellectual labor-saving devices."

> The laws of physics, of astronomy, of geology and the rest are, on their practical side, mere shorthand, or rather short mind formulæ or rules for recovering, with a minimum of mental labor by means of little brains and the mechanical manipulations of a pencil, the past and future facts of nature, which, without these rules and laws, we should have indefinite labor and take indefinite time in recovering. . . . Millions of cases reduce to a single case. All a saving of intellectual labor. But this economy of mental effort is most conspicuous in mathematics. . . . The student who has gained this point of view by contact with mathematical and especially algebraic study, acquires from it a sense of intellectual power and discipline which can be brought home to him with equal force by the study of no other branch of knowledge.

This view of the usefulness of mathematics easily produces arguments for both the formal and the broader side of algebra. The pupil should be letter perfect in the formal operations of algebra and he should know why he should be letter perfect, two things, both of which can not be secured in a first-year course. If algebra is a language one may study the formal grammar and then begin to read, but it is considered better pedagogy, better common sense, to carry the two along together. One can not arrive at a conviction that the essence of algebra is economy in thought until he has done a thinking part in algebra. The boy who takes a second course in algebra is likely to go on with mathematics and this course should furnish the material needed in more advanced mathematics—among other things he should acquire letter-perfect command of certain formal operations.

It may be argued that such a course in

[8] "Why Do We Study Mathematics. A Philosophical and Historical Retrospect." Thomas J. McCormack, The Torch Press, Cedar Rapids, Iowa.

algebra is a utilitarian, a "bread and butter" course. I would not call it such. I would call it a culture course. It has been suggested[9] that we

> Seek to develop a "culture" course in mathematics which should prove attractive to students seeking to inform themselves about the world in which they live; thus to include some account of the evolution of mathematics as a human tool and means of interpretation, as well as a survey of modern applications of mathematics to the understanding of the universe and to the work of the world. Just as many of us can enjoy and respond to operas, epics and great paintings without being artists in these fields, so I think many could be led to appreciate the place of mathematics without becoming mathematicians.

To be successful, such a course should be the finishing touch to a somewhat comprehensive course in mathematics. It is a rare teacher who can hold the attention of a non-mathematical class in such a course. I know but a few men who can do it. A course in algebra such as I have suggested has some of the same aims as this more ambitious course. It tries to give the pupil a glimpse of the place of one branch of mathematics in the world of realities, something he will have long after he says he has forgotten all his algebra.

The problem, "Should mathematics be required of all high-school pupils," is not yet solved. The mathematician can not solve it alone. A definite affirmative answer on his part would bring forth criticisms of lack of breadth of view. A negative answer might be too readily accepted. The solution of the problem will come from the combined efforts of the mathematician, psychologist and general educator. But at present, I believe that injustice will be done a high-school pupil who is allowed to go through school without mathematics, one practical reason being that the door of entrance to a profession for which he is peculiarly fitted may be closed to him. We should try to present to every high-school pupil a broad view of what may lie in the future and to give him a course from which he may be better able to judge for himself as to his best line of endeavor.

[9] Letter from Commissioner Snedden, published by the Association of Mathematics Teachers in New England, in a preliminary report of the committee on the status of mathematics in secondary schools.

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EDUCATIONAL EVENTS

THE PENSION SCHEMES OF THE CARNEGIE FOUNDATION FOR THE ADVANCEMENT OF TEACHING

THE Carnegie Foundation having discovered that its resources are inadequate to carry on the foundation's present system of retiring allowances, the president of the foundation made, it will be remembered, various proposals which were the subject of reports of a committee of the American Association of University Professors and of the faculties of a number of institutions. A commission was finally appointed representing the Carnegie Foundation, the American Association of University Professors, the Association of American Colleges and the National Association of State Universities, which recently made a report which has not yet been made public. The president of the foundation, Dr. Henry S. Pritchett, has, however, addressed to presidents of the associated institutions a letter which reads as follows:

I am directed by the trustees of the Carnegie Foundation to communicate to all associated colleges and universities the following information:

At a meeting held on May 18 the trustees considered the report on the plan of insurance and annuities, prepared by a joint commission appointed in November, 1916. A copy of this report is enclosed. The trustees of the foundation took the following action:

1. The trustees accept the fundamental principles of a pension system as defined in the report of this commission—that is to say, a pension system for college teachers should include the principle of the contributory pension, of cooperation between the teacher and his college, and of the creation of a reserve for each pension.

2. As a means of carrying out this plan the trus-

tees approve the combination of insurance and annuity benefits as proposed by the commission, and accept the proposed Teachers' Insurance and Annuity Association as outlined in this report as a practical and effective method of providing insurance and pension benefits for college teachers. The organization of this agency is completely explained in the report of the president of the foundation now about to be distributed.

3. The trustees of the foundation have asked the Carnegie Corporation of New York to cooperate with the foundation in carrying out the recommendations of this commission by enabling the foundation to fulfil the reasonable expectations of teachers in the associated colleges and universities prior to November 17, 1915; by enabling the foundation to afford some assistance during the transition period of the next twenty years toward the retiring allowances of old teachers in institutions which are not now, but may later be, associated with the foundation; and by supplying the capital necessary to establish the Teachers' Insurance and Annuity Association.

4. The trustees of the Carnegie Foundation, therefore, notify all associated colleges and universities of this action and inform them that the privileges of teachers in the associated colleges under the present rules will not extend to those entering these institutions after the date mentioned.

5. Full information will be given in due time both as to the cooperation of the Carnegie Corporation and as to the conditions and benefits of the contributory system to be inaugurated. It is expected that the Insurance and Annuity Association will be incorporated and organized before the end of 1917.

This communication is sent by direction of the trustees of the foundation. It is requested that the report of the commission be considered as a confidential paper until June eleventh.

THE STUDENTS OF CONNECTICUT COLLEGE AND PRESIDENT SYKES

THE *Connecticut College News* in an editorial article remarks:

Connecticut College has come to the end of the second year of its existence. The close of this year marks the close of two very happy years under the successful administration of our first president, Dr. Sykes. As the president of the Student Government Association said in her commencement address, it is through no wish of the student body that this administration ends, but the students' efforts to prevent its ending have been unavailing.

What the students of this college now face is at best an uncertainty. The *News* made especial efforts to obtain for this issue from the board of trustees, facts relative to the conditions and appointments in the administrative departments and the faculty for next year, for of course such news would be of inestimable value to the students and in fact due them as a matter of fairness. However, we were unable to secure any data whatsoever for this paper. Whatever plans the trustees have for next year, they had not seen fit to divulge them at the time this issue went to press.

We do not as yet know even how many of our present faculty will be here next year, to say nothing of our ignorance as to the man or woman who is to be the new president. We understand that the choice has been made, but it is a matter of mystery.

The commencement address referred to ends with the following paragraph:

Chiefest of all our faculty, stands our first president—Dr. Sykes. In him we recognize a great scholar, a master teacher and a noble leader. Without his untiring loyalty of leadership, and splendid executive power of organization, we have no assurance that our college could have made the advancement it has achieved during its first two years.

It has been said that it is good to be rich, and good to be strong, but better than either to be surrounded by a large circle of friends. Dr. Sykes, perhaps all of these blessings are yours—your students hope so—but of the last they are assured. On behalf of the students of Connecticut College, I would assure you of their faithful friendship, if that is of any value to you who leads them. Through no wish of ours, we are met to-night to bid you farewell for a time, but those of us now present will feel that you are working with us in sympathy and spirit if not in person, and no argument shall convince us to the contrary. Yours is the satisfaction of a great achievement in the field of liberal education for women, with all of its noble aspirations and ideals, and we trust that it may often be your pleasure to join again in good comradeship with your Connecticut College classmates of 1919 and 1920.

THE CHICAGO SCHOOL SITUATION

A CORRESPONDENT sends us from Chicago the following statement reviewing the situation in the schools.

1. In April the legislature passed the bill reorganizing the schools of Chicago. The plan of reorganization called for a board of education of eleven members instead of twenty-one, and authorized the mayor of the city of Chicago to appoint two members for terms of five, four, three and two years, respectively, and three members for a term of one year. The old board of education was to continue in office according to the provision of this bill until all of the new members had been appointed, confirmed by the city council and had qualified.

2. Some weeks back Jacob M. Loeb and Mrs. Francis Thornton, members of the old board, the former president of the old board and the leader of the opposition to the Teachers' Federation, were confirmed for the five-year term.

3. After being confirmed and after the mayor had named the remaining nine members of the new board, Jacob Loeb, before a special meeting of the School Board, charged that the mayor had broken faith with him and instead of appointing high-class men, as he had promised, had filled the board with men and women who were known in the community only because of their political activities. He furthermore exposed some of the inner workings of the Thompson-Lundin ring, and declared that it was the purpose of the mayor's crowd to discharge the trusted civil service employees of the board of education and put in their stead political henchmen of the City Hall organization.

4. There followed weeks of recrimination and investigation by the schools committee of the city council, with the result that the committee recommended to the city council that the nine named be confirmed. By a vote of 45 to 24 the city council confirmed the mayor's nine appointees on Monday, June 18. These nine immediately qualified and on Tuesday morning at 9 o'clock met at the rooms of the board of education, organized as a board of education, elected Edwin S. Davis, as president, and in place of Lewis E. Larson, who has been the business manager of the board of education for the past ten years and a civil service employee of the board of education for twenty-three years, they elected Percy Coffin, an employee at the City Hall, business manager, at a salary of $10,000 per year. Mr. Larson was also ousted as secretary, having held the positions of both business manager and secretary, and in his place the new board put A. H. Miller, one of the backers of former U. S. Senator Lorimer. C. R. Francis, who had held the appointive office of city attorney under Thompson, was made attorney for the board of education at $10,000 instead of A. R. Shannon, who had been the attorney for the board of education for the past twenty or more years. Shannon and Larson had been elected by the old board of education for terms of four years but the new board declared that action illegal.

5. As a result of this action public feeling ran high. At the adjourned meeting of the city council on June 20, on account of the agitation, the city council moved to reconsider its action confirming the nine appointees, and refused to confirm them by a vote of 48 to 22.

We do not know where we are at present, under what officers we are operating or whether any of our proceedings are legal or not. In the meantime the city council is seeking means to impeach and remove from public office Mayor Thompson.

EDUCATIONAL NOTES AND NEWS

DR. WILLIAM DE WITT HYDE, president of Bowdoin College since 1885 and distinguished as a leader in higher education, died at his home in Brunswick, Me., on June 29, aged fifty-nine years.

THE Rev. Dr. Almon Gunnison, for fifteen years president of St. Lawrence University, Canton, N. Y., and since 1914 president emeritus of that university, died on June 30, in his seventy-fourth year.

AT the annual convention of the Catholic Educational Association, meeting in Buffalo, N. Y., on June 28, Cardinal Gibbons was elected honorary president, and Bishop Shanan, president-general of the association.

AT a meeting of the trustees of the University of Arkansas, held recently, the honorary degree of doctor of laws was conferred on Governor Charles H. Brough, of Arkansas. Before his election as governor, Dr. Brough was professor of economics and sociology in the university.

PRINCETON UNIVERSITY at its recent commencement conferred the degree of doctor of laws on Frank Johnson Goodnow, president of the Johns Hopkins University.

THE University of Michigan has conferred its doctorate of laws on Dr. Livingston Farrand, president of the University of Colorado.

THE University of Vermont has conferred

the doctorate of laws on Milo B. Hillegas the state commissioner of education.

Among honorary degrees conferred by Dartmouth College at commencement were: doctor of divinity on Rev. Samuel S. Drury, rector of St. Paul's School; master of arts on James A. Tufts, professor of English at Phillips Exeter; doctor of pedagogy on Don C. Bliss of Montclair, N. J., and master of pedagogy on Walter Sampson, '86, superintendent of schools in Middleboro, Mass.

Williams College has conferred the doctorate of laws on Frederick C. Ferry, '91, dean of Williams College since 1902, and recently elected president of Hamilton College.

Former and present graduate students of the department of psychology of Cornell University and a number of his more intimate friends among the faculty met with Professor E. B. Titchener in the psychological laboratory on the evening of June 22, to celebrate the completion of twenty-five years of his service to Cornell. A volume of "Studies in Psychology," edited by Professors W. B. Pillsbury, J. W. Baird and M. F. Washburn, was presented to him on the occasion. The book contains also "A Bibliography of the Published Writings of Edward Bradford Titchener" and "A Letter to Dr. Titchener," by E. C. Sanford. Contributors to the volume are: M. F. Washburn, W. B. Pillsbury, C. G. Shaw, J. W. Baird, R. M. Ogden, R. H. Gault, H. C. Stevens, L. R. Geissler, H. M. Clarke, H. P. Weld, A. S. Edwards, K. M. Dallenbach, C. A. Ruckmich, L. D. and E. G. Boring, C. E. Ferree and G. Rand, J. N. Curtis, and W. S. Foster. After the presentation, Professor Titchener responded with some reminiscences of the early days of the Cornell Laboratory, and in conclusion announced that he had declined acceptance of the chair of psychology recently tendered him by Harvard University.

Dr. Anton H. Appelmann, of the University of Vermont, was charged last year with anti-American activities and the alumni appointed a committee to investigate. The report was four to one for acquitting Dr. Appelmann of the charges, but when the trustees met to consider the report in April they voted to accept the majority's version of the results of the hearing, but also to accept Professor Appelmann's resignation to take effect at the end of the college year. Then, it is understood, President Benton appeared before the board, and, on the ground that not to reinstate Dr. Appelmann was tantamount to a request for Dr. Benton's resignation, asked the board of trustees to rescind their vote of April. This, the trustees, by a narrow majority and with several absent, voted to do. Dr. Appelmann, accordingly, was reinstated as professor of German. This verdict, however, did not satisfy the alumni, who took up the case at their commencement day meeting. Discussion was exceedingly warm and it was only by the narrowest margin that the meeting did not adopt the original minority report, which called for dismissal.

Professor F. Baldensperger, of the Sorbonne, critic and historian of French literature, has been appointed exchange professor at Columbia University for the next academic year.

Professor Carl E. Seashore, dean of the graduate college at the Iowa State University and head of the department of psychology, has gone to the University of California to lecture on his methods of making the science of psychology useful in the teaching of music. He will give other courses during the summer session of the University of California, but great stress will be laid on the relation of psychology to music.

Edward William Clark, of the high school at Long Beach, California, and before the war director of the Bureau of University Travel in Rome, has been appointed superintendent of schools in Venice, Cal.

The University of Oklahoma summer school has opened with 1,200 pupils, which is an increase of fifty per cent. over last year. The director, Dr. W. W. Phelan, has arranged a public lecture course. The leading lecturers are Dr. Ian C. Hannah, late of Cambridge University, England, now of Oberlin, who is

giving two lecture courses on the "Reconstruction of Europe" and the "Far East and the modern world"; Superintendent J. M. Gwynn, of New Orleans, has given two courses on "High school problems" and "City school administration"; and Superintendent H. B. Wilson, of Topeka, Kansas, will give a short course on "Educational problems and motivation of the school work."

THROUGH Assistant Commissioner of Education for New Jersey, A. B. Meredith, the New York University School of Pedagogy will offer next year a new course on the "Legal aspects of school supervision." The purpose is to deal in a comparative way with fundamental legal aspects of the New York, New Jersey and Pennsylvania school systems with special emphasis upon New Jersey school law. Among the topics included will be state school systems, powers of boards of education, management of city and township school districts, the tenure and position of teachers, the distribution of state and county moneys, compulsory school attendance, vocational education and teachers' certificates.

THE American Association of University Professors will hold its annual meeting at Chicago, probably on December 27 and 28.

To meet war conditions Colgate University has decided to compress its next college year into the period from October 4 to May 7. Work will be done on six days a week instead of five.

THE trustees have voted to continue the entire work of the University of Arkansas during war time, except that the last two years of the medical college will be discontinued until sufficient funds and clinical facilities are available to place the college in the "A" class of American medical schools. Several new faculty positions were established, the most important being a professorship of secondary education, the holder of which will devote one half time to visiting high schools and the other half to teaching in the college of education. This position has not yet been filled.

A DEPARTMENT of education will be established next winter at Washburn College, Topeka, Kans. Dr. J. L. Much, of the Ohio State University, has been elected dean.

OWING to the need for further accommodation for the war staff in the immediate neighborhood of the War Office and Admiralty, the offices of the British Board of Education are to be removed to the Victoria and Albert Museum at the request of the prime minister. Although the administrative offices will be at South Kensington, rooms in Whitehall will be retained for the use of the president, parliamentary secretary and permanent secretary of the board, and for conferences, deputations and interviews.

FUEL equipment and other necessities have cost so much this year that no funds are left for any marked advance in teachers' salaries, the Boston school committee has decided. It has been voted, however, to seek money for increased pay rolls from the next legislature.

WE learn from *The Journal of Education* that the St. Louis board of education has purchased from Washington University the Woodward Manual Training School and Mary Institute for $300,000. The manual training school was founded by the late Dr. C. M. Woodward, dean of the school of engineering and architecture of Washington University, more than thirty years ago and during the first fifteen years of its existence was noted for its advanced views regarding the manual arts. For many years Mary Institute has been the girls' preparatory school for Washington University. On account of the improved condition of the high schools in this state, the preparatory schools are no longer needed by the university.

LEVI BARBOUR, a Detroit manufacturer, has given $150,000 to the University of Michigan. Of this gift $100,000 will be used to construct a residence hall for university women and $50,000 to create a fund for scholarships for women from Oriental countries.

LAWRENCE COLLEGE, at Appleton, Wis., is erecting two new buildings, which will add materially to its plant. One of these is a dormitory for women to cost $125,000, towards which Mrs. Russell Sage contributed $100,000.

It will be ready for occupancy in September. The other building is a chapel which will cost $110,000 and which will have a seating capacity of two thousand. The money for this was largely raised in a campaign made in February in Appleton, $135,000 being given for the chapel and some other purposes. The chapel will not be completed before next April or May.

THE University of Chicago and the trustees of the Ellen H. Richards Memorial Fund jointly offer a graduate fellowship of five hundred dollars and tuition to be used at the University of Chicago during the year 1917–18. Candidates must hold a bachelor's degree and be equipped to do advanced graduate work in some phase of household administration.

A GIFT of $200,000 to the endowment fund of Phillips Exeter Academy has been announced. The money is given by two members of the class of 1858, the Honorable Edward Tuck, of Paris, and Edmund J. Curley, of West Newbury, Mass. The income is to be used to increase the salaries of the members of the teaching corps.

THE board of education of South Pueblo, Colo., has raised the mimimum and maximum salaries of all teachers, the former from $500 to $600, and the latter from $900 to $1,000. The maximum for the seventh and eighth grades has been raised to $1,200, and the high school teachers to $1,700.

ONE hundred and fifty teachers have secured positions for the coming year through the committee on recommendations of the State Normal School at Emporia. The annual salaries range from $540 to $1,600. Practically all the seniors have positions. The salaries for the seniors employed through the Normal School range, for women, from $720 to $900, and for men from $900 to $1,300. The highest salaries have gone to graduate students. "There are twice as many calls for well-trained men and women as we are able to supply," said Carl W. Salser, chairman of the recommendation committee. "Men are especially needed in agriculture, manual training and athletics. Women are needed in normal training, languages, and all high-school subjects. In these branches the jobs seek the teachers. The salaries are not affected by competition between men and women. There is little competition between men and women in the field of teaching. Men are demanded for certain positions. The small number available leads to better wages for men. Among women competition is keener because of larger numbers of women teachers. The result is lower wages for women teachers. This explains the difference in salaries obtained by senior men and women."

BY a vote of the Boston School Committee, "those employees of the school committee who enter the military or naval service of the United States between March 25, 1917, and the close of the war, as determined by the United States government, where the compensation of such employees in the federal service is less than the net compensation they were receiving at the time of leaving the service of the committee, shall be paid an amount equal to the difference between the net compensation which they were receiving at the time of leaving the service of the committee and the pay which they receive while in said military or naval service under the acts of Congress and of the commonwealth of Massachusetts, including aid to their dependents."

THE *Michigan Alumnus* reports the names of the following members of the faculty who have enlisted in government service: Dr. Victor C. Vaughan, who is a member of the medical advisory board of the Council of National Defense, is spending practically all his time in Washington; Professor Alfred H. White, head of the department of chemical engineering, has entered the government service as captain, assigned to the duty of organization of inspection in the manufacture of munitions; Dr. Udo J. Wile has entered the medical service of the army with the rank of major, as has Dr. Reuben Peterson, who is now organizing a Michigan hospital unit. Many other members of the medical school are expecting to be called at any time; Dean Henry M. Bates and Professor J. S. Reeves have both been commissioned majors in the Judge Advocate General's Department and are awaiting

assignment; Professor H. C. Sadler has for some time been making investigations in boat designing for the government. Whether he will be sent to Washington or continue his work at Ann Arbor is yet uncertain. Peter Field, associate professor of mathematics, has entered the training camp at Fort Sheridan. He expects to be transferred to the coast artillery division. H. S. Sheppard, assistant professor of electrical engineering, who has received his commission as captain, was to leave for Washington the middle of June, where he has been detailed for work in the department of electrical communications. Alfred H. Lovell, associate professor of electrical engineering, has entered the Reserve Engineers' Corps at Fort Sheridan, as has also V. A. Moody, assistant in history. Dr. H. H. M. Malejan, Dr. John W. Sherrick and Dr. C. L. Washburne, instructors in the medical school, are in active service, as is also V. Donatelli, assistant in surveying.

THE annual report of the principal of the University of Birmingham, Sir Oliver Lodge, presented to the Court of Governors, states that the registered students of all kinds last session numbered 689, of which number 370 were matriculated students. Compared with the previous year this represents a decrease of 97. The work of the university has been in no sense stopped by the temporary entire loss of the new buildings at Bournbrook, which have been lent to the war office for use as the First Southern General Hospital. Seventy-seven members of the staff are now on active service. A great deal of work of a confidential character was being done by the university in connection with the war. It was hardly possible to overestimate the national importance of agriculture, and it was to be hoped that when funds were forthcoming the whole subject of agriculture would be dealt with by their university, among others, on an extended scale. Two changes of importance had been made in the medical curriculum. One was that, although Latin was recommended as a matriculation subject for those intending to enter the medical faculty, it was no longer to be insisted upon. Another modern language or a science might be offered instead. Another, and much more important, change was the reintroduction after 10 years of botany into the subject of elementary biology for the first year of training subsequent to matriculation.

DISCUSSION AND CORRESPONDENCE

THE ASSOCIATION TEST AS A SUBSTITUTE FOR THE QUIZ

A NUMBER of psychologists are, no doubt, in the habit of giving an association test as a substitute for class quizzes or examinations. I am recording my experience with such tests as a bit of description which may be useful for those who have not utilized them in the way I mention and as a possible incentive for teachers of subjects other than psychology to try out this device. My conviction as to the pedagogical value of the association test has taken form during three years' rather extensive use of it. Its employment not only saves considerable time but also gives the teacher precise information concerning the students' types of reaction as well as their range of information.

Briefly put, the test consists in reading orally a list of words to which the students react seriatim with a written word or phrase that represents an advance on the stimulus-word. The student may, of course, select his reaction. My procedure involves my giving, preliminary to the test proper, a phrase that is to determine the "set of mind" with reference to which the associations are to be selected. For example, the general topic by reference to which all associations are to be evaluated may be "Attention," or "Space-Perception," or "Transfer of Mental Training." I then read slowly, at the approximate rate of one word every forty-five seconds, a list of words which are to elicit appropriate responses. The "mental set," for instance, may be "Memory and Imagination" with such stimulus words as the following: Impressionability, Meumann, Galton, Mimetic Imagery, Abstract Thinking, etc.

First as to economy of time. I estimate that in an association test, taking from fifteen to twenty minutes, it is possible to cover as

much ground and to cover it as effectively as in a written quiz of fifty-five minutes. Correction of papers takes a correspondingly abbreviated time. A greater advantage, however, is that the test permits the instructor to make a close and profitable analysis of different types of response. Presentation of this analysis to the class enables individual students to see wherein lie the faults in their methods of study.

I have found the following categories valuable in classification of unsatisfactory reactions:

1. The circular response. This consists in giving a synonym of the stimulus-word or some other form of periphasis. It is accepted as satisfactory only when the term is a technical one or a new one whose meaning is in process of being learned. In an elementary class, for example, "nearsightedness" would be accepted as a satisfactory response to "myopia." Usually, however, the circular response shows no real advance and is given no credit. The circular response characterizes that type of student who takes refuge in verbosity and circumlocution; who delights in much writing and little thinking, often without check on the part of the instructor who permits him to "write around" a subject and accepts quantity as a substitute for quality. In the association test this type of student meets his fate. A tendency to mere verbal completion of phrases is also checked by such a form of quiz.

2. The vague or indefinite response. This type of reaction characterizes the student who thinks loosely or who has failed to master the subject-matter. He has recourse to a general rather than a specific association as when the stimulus-word "astigmatism" brings the reaction, "Eyes do not focus properly." Indefiniteness is also indicated by the need of using the same reaction to different stimulus-words. It is easy to convince a class that repetition of response shows paucity of information. If, for example, the names Meumann, Hall, and James, all call out the reaction "psychologist," there is little real information in the possession of the student. Particularly objectionable is the obvious response; for instance, "illusion," "mental state."

3. The irrelevant response. An irrelevant reaction may be due to lack of information or may indicate lack of comprehension or confusion of thought. If "moron" brings the response "element of the nervous system" we have an example of a totally irrelevant association.

4. The response that is "off" the prescribed "mental set." This reaction is a variant of the irrelevant response. In itself it is correct but it fails to satisfy the requirements of the instructions. Thus, if the mental set is "Imagination" and the term Galton calls out the response "Finger Prints," it is evident that the student has certain information at hand but information that is not relevant to the "set." Maintaining a definite set has excellent value in developing capacity for inhibition and selection. It is particularly enlightening to give the same stimulus term under a number of different mental sets. In a long test "General Intelligence" was once given, with very interesting results, under five different "sets," as follows: Psychology of Testimony, Suggestibility, Intelligence Scales, Sense-Discrimination, Handwriting.

5. The response to part only of the stimulus. This reaction is equivalent to that kind of an answer to a question which ignores the question as a whole and amplifies one word contained in the question, as for example when a student reacts to "Various interpretations of plateau" (in learning process) with "Period of no improvement" or "Should be avoided," etc.

A number of my students have stated for me their opinion as to the value of the association test as a pedagogical device. Quick-thinking students who dislike the mechanical labor involved in writing usually welcome the test. Logically-minded students enjoy it. Others like it because it sharpens their discrimination in reviewing a text. Many, however, find it difficult and distasteful, no doubt often because it prevents "bluffing." Among the dissatisfied there are, however, a number

who actually do think slowly and find a time-limitation confusing and emotionally disturbing. Usually, practise and a closer study of the text enable them to speed up, but not always. On the whole, however, the results, so far as grades are concerned, parallel pretty closely the outcome of a written quiz, with the advantage of time saved for both student and instructor and greater precision in scoring. Of course if used mechanically such a test might lend itself to stereotyped responses and encourage verbal memorizing. I try always to emphasize the possibility of many satisfactory responses and the high value of original reactions.

Other psychological tests suggest themselves as pedagogical devices. I understand that a number of teachers adapt the completion test to their needs. The dissected sentence may be used to good purpose and often discloses a failure to understand the author's treatment of a particular subject. An "opposites test" as a variant of the association test serves to sharpen a student's discrimination. The average college student may have only a hazy notion of the opposite of such terms as "peripheral," "contiguous," "symbolic," and the like.

Next to the association test I have, however, found a Likeness-Difference test to be of most value. It consists in giving pairs of terms and asking for a set number of likenesses or differences or both. One might give such terms as "Instincts and habits," "Sensation and percept," "Emotions and sentiments." Even when a student is allowed to handle such a test with a chosen author open for reference he finds it difficult. Likenesses seem to be even more difficult to state than differences. The attempt, however, to make the comparisons brings to light many places of deficient comprehension.

JUNE E. DOWNEY
UNIVERSITY OF WYOMING

QUOTATIONS

WHERE THE COLLEGE HAS SUCCEEDED

UNDIFFERENTIATED competence is the characteristic of American youth in general. In no older country is it so difficult to predict the future career of a typical schoolboy. The college preserves, for a select group, the condition of undifferentiation through the early years of manhood. Has this proved a disadvantage in peace; and will it be found to be a disadvantage in war? These questions are not easy to answer conclusively.

One who knows well the class of young men who graduate from our colleges will recognize certain common qualities that go far to explain the fact that after all, college men do as a rule succeed in life. Underneath their seeming self-complacency a close observer can detect a humility that makes them ready to begin at the bottom where promise of rising is in sight. They may have been dawdlers in college, content with a "gentleman's mediocrity," but they do not expect real life to surrender to any other force than hard work. They may have frowned upon the cultivation of exceptional talents in college, but they are painfully on the alert, upon graduation, to discover in themselves any inborn or acquired quality that may be made to count toward success. A group of college graduates may be raw material, but it is raw material infused with a very active spirit of life.

The American college succeeds in keeping its students mentally alert, but undifferentiated as to careers, several years beyond the point at which most German students have not only chosen their careers but have already laid a foundation for them. We seem to waste much time. And yet the achievements of later life seem not to convict us of real waste. In spite of later beginnings, the American business man will compare very well with the best of the Germans. The American surgeon and the American engineer, at their best, can not be matched by their German colleagues. It might almost appear that we are fortunate in having no very close coordination between college training and professional or business life. There are missing rungs in the ladder to success, to discourage the mediocre or ill adapted. With so perfectly devised a system as the German

there is nothing to prevent the mediocre man, or the man whose talents are misapplied, from rising to the very top, provided that he is persistent and single-minded. It is certain that many Germans holding positions of great distinction may be almost wholly explained in terms of the system and time. Personal qualities appears as a negligible item.

The American college student, in so far as he works at all, is working with no direct consideration of personal gain. Latin A or Geology I are not expected to contribute to his success in whatever career he may pursue. And perhaps for this very reason the typical college produces a quite astonishing proportion of young men who will eagerly enlist for any work of public service. In the last two years colleges have proved the best field for recruiting young men for Ambulance service. Much of the early efficiency of American relief work in Belgium has been ascribed to a personnel consisting largely of men imbued with the college spirit. They worked incessantly, ardently, intelligently, with no thought of personal gain or credit. Naturally: our colleges swarm with men who would do likewise. Is this not a great deal to say for the colleges?

Now war is on, our colleges are doing their part. One of the conditions that the Germans counted on, when they decided to risk American intervention, was our notorious lack of officers to make effective our otherwise unlimited man power. They reckoned without our colleges. Here we have tens of thousands of young men, physically fit and mentally alert, willing to work harder than any other class of men in equipping themselves with the essentials of the military officer's art. They are not men who fret over the loss of a year or two that might be applied to their training as accountants or physicians or philologists. They have given years to undifferentiated culture and they are willing to give further years to the national service, not doubting that they will fit themselves satisfactorily into the scheme of practical affairs when the war is over. Therefore they have not hung back, waiting for the formal draft, but by thousands have applied themselves to the acquisition of military training with an energy to astonish and sadden their former teachers, in whose courses a zeal for work had not been conspicuous. Thanks to the colleges, we shall not lack material for officers when our body of recruits is forthcoming.

From the point of view of national military efficiency, then, the American college has succeeded. It has selected a body of young men who are available for the national service and it has animated them with a spirit that will make their services invaluable. And from the point of view of national efficiency in peace, the college, we shall probably come to realize better, has played its part successfully. Its methods have operated, more or less blindly to be sure, toward keeping vigorous the ideal of general adaptability which is perhaps the nation's greater asset.—*The New Republic.*

BOOKS AND LITERATURE

EDUCATIONAL JOURNALS

The School Review—June

Problems peculiar to the junior college: James Rowland Angell.

Experiments in supervised study: I. M. Allen.

A standard of interpretation of numerical grades: LeRoy D. Weld.

High-school fraternities: J. G. Masters.

Adolescent moral delinquency and the attainment of social values: F. M. Giles.

Education—June

Administrative aspects of the high school of tomorrow: Franklin W. Johnson.

The modernized school curriculum: D. W. Hering.

"America first" campaign in Massachusetts: W. I. Hamilton.

Some opportunities that come to country schoolmasters: Garry C. Myers.

Qualifications for normal-school training and the teaching profession: William B. Aspinwall.

Standards in English: W. C. Sayrs.

In a hospital. (Poem.) Minnie E. Hays.

The supervisor and his boys: By a Superintendent's Wife.

The Catholic Educational Review

Religious instruction in Catholic colleges: W. F. Cunningham, C.S.C.

The teaching and development of ecclesiastical music in the early church: F. J. Kelly.
Pestalozzi's Anschauung in theory and practise: Sister Mary Rosalie.
Educating for disinterested service: Sister Mary Ruth, O.S.D.

The Journal of Home Economics—June

The mother-daughter home canning club: O. H. Benson.
Some practical suggestions from the American Chemical Society: Louise Stanley.
A home with an income: Annette Harvey.

Manual Training Magazine—June

Acquainting the schools with local industries: George B. Davis.
A vocational machine-shop course: Miles M. Smith.
Printing as a manual-training subject: L. S. Burnell.
Practical concrete work in the grammar grades at St. Johnsbury, Vermont: Leon H. Baxter.
Waste baskets: Lucius Y. Conahey.
A cabinet as a high-school project: Thomas H. Elson.
The Philadelphia meeting of the Eastern Arts Association: James McKinney.

THE SMITH-HUGHES ACT AND THE STATES

A FEW weeks ago a circular of inquiry concerning plans for administering the Smith-Hughes Act was addressed to the state superintendents of public instruction. The answers summarized below show varying opinions regarding this phase of education. Most of the superintendents express the opinion that the formation of state plans should await the definite announcement of federal policies, while some seem to think that the state, working within the limits of the many details of the Act, should take the initiative. The correspondence indicates that many state plans will be ready to submit by the middle of June. It is hoped that the principal conclusions of each state board will find their way to all states to the end that reasonable uniformity may be reached.

J. F. MARSH,
Secretary, State Board of Regents, Charleston, West Virginia

Arizona

State board of education designated as vocational board.
No definite plans formulated.

Arkansas

Board has not met.
Teacher training to be done in four state agricultural schools, and in best high schools.
Had not thought that help could be given to normal schools.
Will consider possibility of connecting agricultural club work with this work.

Connecticut

Legislature has not acted.

Delaware

Committee of state board of education about ready to report its plan.

Florida

Bill of acceptance pending.

Georgia

Awaiting advice of federal authorities.

Idaho

Bill to make appropriation for this purpose was defeated in the legislature.

Illinois

Struggling to reach an agreement as to a vocational board.

Indiana

Department of public instruction has taken no action.

Kansas

State board of education at work on details.
Teacher training to be done in State Agricultural College and State Manual Training Normal School.
Vocational work will be done in high schools.
Club work will not likely be accepted as project work in agriculture.

Kentucky

No definite plans completed.
Teacher training to be done in State University and normal schools.
Later some work will be done in county high schools.

Louisiana

State board of education is the vocational board.

Plan has been completed but has not been received at this office.

Maryland

State board of education at work on the problem.

Maine

Governor has not appointed vocational board.

Two state normal schools and the state university will likely train teachers, the university doing all of the work in agriculture.

Massachusetts

The state board of education has published an interesting digest of the Act with comments relative to Massachusetts.

College of Agriculture will probably do teacher training work in agriculture, some of the normal schools doing some of the work in homemaking. The training of teachers for industrial schools will likely be done in evening classes.

Agricultural club work could not be accepted as project work.

Michigan

Legislature passed a bill accepting the benefits January 1, 1919.

Board of control for vocational training composed of: president agricultural college, president university, president state board of education and superintendent of public instruction.

No definite plans formulated.

Minnesota

State high school board will administer the Act.

The normal schools and university will probably benefit from the Act.

Will offer agricultural club work as a part of the education in agriculture.

Mississippi

Board will report May 12.

State directors will have charge.

A. & M. colleges (white and colored), Girls' College and University, and possibly normal school will train teachers.

Three fifths of remainder for agriculture (after paying salary and expenses of director) to agricultural high schools.

Two fifths to ascertain consolidated schools.

Missouri

General act of acceptance passed legislature.

Teacher training will likely be done in university and normal schools.

Vocational work will be carried on in high schools.

Nebraska

Vocational committee made up of governor, state treasurer and state superintendent.

No program has been made.

Nevada

State board of education is vocational board.

$30,000 ($15,000 for each year) appropriated to meet federal appropriations for two years.

Teacher training to be done at state university and normal school which is connected with the university.

High schools will do a part of the vocational work.

New Hampshire

Vocational commission to be appointed by governor.

State college will do most of teacher training, but this will not likely be limited to one institution.

Normal schools will probably train teachers for household arts and agriculture.

Extremely unlikely that agricultural club work will be accepted as project work. It does not receive enough supervision.

Much care and firmness necessary if the undertaking is to be a success.

New Jersey

State board of education is vocational board.

The board has outlined the Act with elaborate comment as to its application in New Jersey.

A state director of agricultural education employed jointly by state college and state department of education recommended.

Teachers of agriculture and other industries will probably be trained in state college.

One of state normal schools will probably train teachers in home economics.

Some industrial teachers will be prepared in evening or part-time classes.

Some teachers may be selected from trades and given very brief training.

Federal funds will be distributed to districts that have established vocational schools.

Part-time classes at Passaic, Paterson and Newark will probably be eligible for aid.

Aid will not likely be given for ordinary work in vocational subjects in ordinary schools, but only to vocational schools.

New York

Teachers of agriculture will be trained in New York State College of Agriculture.

It is not likely that any of this work will be performed by the normal schools.

Agriculture will be taught in special classes in high schools.

The work of agricultural clubs will not be approved.

Bulletins issued show type of work in agriculture being done in high schools.

North Carolina

Vocational board provided by last legislature.

No plans formulated.

North Dakota

Legislature of 1917 took no action regarding the measure.

Ohio

Legislature created a state board of education, but it has not been appointed.

Not much can be done until federal board has been appointed.

Oklahoma

Vocational board consists of state superintendent, presidents of State University and A. & M. College and board of agriculture; the fifth member—the secretary—appointed by governor.

Over $35,000 for each year appropriated for this work.

Oregon

The state board of education is working on plans.

Pennsylvania

Enabling act pending in legislature.

Rhode Island

General Assembly did not accept the provisions of the Act.

The commissioner of education says: "The effect of the revision (by Congress) was to bind up everything so tightly that acceptance warranted very careful consideration."

South Carolina

Hope to cooperate when federal board expresses its policies and wishes.

South Dakota

Board of education not fully organized.

Awaiting instructions from federal board.

Tennessee

State board of education made vocational board.

No plans formulated.

Board will meet for this purpose May 10.

Texas

No action taken.

Definite information can not be secured from national authorities.

Utah

Act of acceptance passed.

State appropriation made.

No plans formulated.

Vermont

State board of education in charge.

Director of agricultural education will be employed.

Washington

State board of education working on plans.

West Virginia

State board of regents (in charge of 11 state educational institutions) made vocational board.

Regular appropriations and funds for schools will be used to meet federal funds.

Most of teacher training will be done at state university, but some of normal schools may qualify to train teachers of home economics. (Policy not fully determined.)

Two state preparatory schools changed to state vocational schools of secondary grade by recent session of legislature.

Certain high schools and state institutions will organize special vocational classes or departments.

Evening and part-time schools will do some of the work in industrial centers.

It is hoped to give some recognition under this law to closely supervised agricultural club work as project work.

Wisconsin

Enabling act pending in legislature.

State superintendent thinks exchange of state ideas is needed in order to arrive at reasonable agreement.

Wyoming

State board of education is vocational board.

No plans have been formulated.

Note.—Doubtless much progress has been made in many states since the replies to my inquiry were written. I shall be pleased to receive any available information or literature bearing upon this question.

EDUCATIONAL RESEARCH AND STATISTICS

PHYSICAL ABILITY VS. MENTAL ABILITY

THE purpose of this investigation was to discover whether or not there is any correlation between the athletic ability and the mental ability of elementary-school boys. The data were obtained as follows: The physical data were obtained from a series of athletic tests given the boys in the grades five to eight inclusive. The directions for scoring and giving the tests were taken from the booklet, "Outdoor Athletic Test for Boys" by John Brown, Jr., M.D., published by the Association Press, New York City. The boys were first classified according to weight and then each boy was timed in a dash either 60 yards, 75 yards or 100 yards according to his weight class. The other events were the standing broad jump, running broad jump, the baseball throw and the running high jump for the two upper weight classes. These tests were given in May, 1916, at the usual recess periods, and extended over a period of some three weeks. Every boy was scored for each event and the average of these scores became his score for class standing. In this way it became possible to arrange all of the 128 boys according to their athletic ability. Their scholastic standing was taken from their record cards and was the average of the different marks given them by their different teachers from the third grade up.

Subjecting the above data to statistical treatment results were obtained as shown in the table above.

Measure	Formula	Physical Tests, Value	Scholastic Standing, Value
Mean	M equals $\frac{\Sigma m}{n}$	46	77.6
Median	$\frac{n \text{ plus } 1}{2}$	47	78.
Av. deviation	$\frac{\Sigma d}{n}$	13	3.6
Standard deviation	$\sqrt{\frac{d_1^2+d_2^2+d_3^2 \cdots d_n^2}{n}}$	15.7	4.5
Probable error	$.6745\sigma$	10.58	3.0352
Coefficient of variability	$\frac{\sigma}{m}$	.33	.057
Coefficient of correlation (Pearson's)	$\frac{\Sigma xy}{n\sigma_1\sigma_2}$	478 / 9043.2 or .0528	
Probable error of correlation	$6745\frac{1-r^2}{\sqrt{n}}$	.05729	

It would appear from the above results obtained from the application of the Pearson formula for the coefficient of correlation that there may be no correlation between the physical ability of the boys tested and their scholastic standing but possibly the reverse. The boys who stood highest in the athletic tests were as a whole no better in their scholastic standing than the boys who did the poorest in the athletic events. This fact is shown more clearly by taking the ten best and the ten poorest in the athletic events and arranging them in order of rank in two tables, one for athletic ability and one for scholastic standing. This shows that six of the ten best boys in athletics fall in the lower half of the table for scholastic standing. The coefficient of correlation for these twenty boys is .0918 with a probable error of .14906, thus showing again no correlation.

The following is the tabulated distribution of the boys according to their physical and scholastic ability:

ATHLETIC ABILITY DISTRIBUTION

Score in points	1– 5,	5–10,	10–15,	15–20,	20–25,
No. of boys..	1	0	3	7	3
Score in points	25–30,	30–35,	35–40,	40–45,	45–50,
No. of boys..	3	12	17	13	15
Score in points	50–55,	55–60,	60–65,	65–70,	70–75
No. of boys..	10	11	16	13	4

SCHOLARSHIP DISTRIBUTION

Standing in per cent...	68,	69,	70,	71,	72,	73,	74,
No. of boys	3	2	3	8	3	5	6
Standing in per cent...	75,	76,	77,	78,	79,	80,	81,
No. of boys	8	12	6	11	10	10	13
Standing in per cent...	82,	83,	84,	85,	86,	87,	88
No. of boys	11	5	3	2	3	3	1

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